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COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

EXAMINER	
FLORES, LEON	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/799,322	JONSSON, ELIAS	
	Examiner	Art Unit	
	LEON FLORES	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 April 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,9,17-22,24,28,31-36,38 and 42-45* is/are rejected.

7)☒ Claim(s) *8, 10, 11-16, 21, 23, 25-27, 29-30, 35, 37, 39-41, 46* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

In view of the appeal brief filed on 04/15/2009, PROSECUTION IS HEREBY REOPENED. An Ex-Parte Quayle (or new ground of rejection) set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below: /Mohammad H Ghayour/

Supervisory Patent Examiner, Art Unit 2611

Response to Arguments

1. Neither reference discloses the claimed "cancellation metric"

Reznik's matrix S is not "a scalar value."

Applicant asserts that *"None of the components of Reznik's Equation 10 is a scalar value; each of the terms is either a vector or a matrix. Id. In particular, Reznik's matrix S, the focus of the examiner's rejections and arguments, is clearly not a scalar value".*

The examiner respectfully disagrees. The examiner did not, at any point, state that matrix S is scalar value. To make it clear for the record, matrix S is a matrix comprised of scalar values. In fact, appellant does state that "appellant does not dispute that Reznik's matrices O and S are scalar values". (See page 10, last line) The examiner does agree with appellant in that equation 10 is not a scalar value, however, the point that appellant is missing is that the multiplication of the elements in equation 10 are, in fact, being multiplied by a matrix comprised of scalar values. The examiner believes that multiplication of matrices is very fundamental, and that the need to illustrate simple mathematical operation, is, at this point, not necessary.
Having clarified this issue, the reference of Reznik does suggest scaling the estimated inter-symbol interference by a cancellation metric (See equation 10 “Matrix S" & claim 49 “Matrix S such that said scaling performs cancellation of inter-symbol interference ISI”) comprising a scalar value (“matrix S comprised of scalar values being multiplied in equation 10 in order to cancel interference”) representing characterized or measured inter-symbol interference cancellation performance of the receiver. (this last limitation will be discussed in the latter arguments)

Applicant further asserts that *“Appellant does not dispute that Reznik's matrices 0 and S are formed from scalar values. But it clearly does not follow that matrix S is a scalar value which term would be understood by a person of ordinary skill in the art to refer to a single real number, rather than a vector or matrix. The examiner's argument on this point is completely spurious”.*

The examiner respectfully disagrees. Again, the examiner did not, at any point, state that matrix S is scalar value. To make it clear for the record, matrix S is a matrix comprised of scalar values. In fact, applicant does state that "appellant does not dispute that Reznik's matrices O and S are scalar values". (See page 10, last line) The examiner does agree with appellant in that that equation 10 is not a scalar value, however, the point that appellant is missing is that the multiplication of the elements in equation 10 are, in fact, being multiplied by a matrix comprised of scalar values. The examiner believes that multiplication of matrices is very fundamental, and the need to illustrate is, at this point, not necessary.

Reznik's matrix S does not represent "characterized or measured inter-symbol performance of the receiver."

Applicant further asserts that *"there is no teaching or suggestion in Reznik with regards to a cancellation metric that represents the characterized or measured inter-symbol interference cancellation performance of the receiver. In fact, Reznik is utterly silent with respect to inter-symbol interference cancellation performance of a receiver, and does not provide any hint that the receiver's performance should be measured, characterized, or otherwise quantified. Although the examiner offers Reznik's matrix S for the claimed cancellation metric, Reznik actually teaches that S is calculated directly from estimates of the system channel impulse response, completely without regard to the interference-cancellation performance of a particular receiver. See Reznik, ¶¶ [0091]-[0092]. Reznik does not otherwise suggest that the matrix S is somehow*

representative of the measured or characterized cancellation performance of a receiver".

The examiner respectfully disagrees. In the final office action dated 9/17/2008, the examiner made it very clear that "a scalar value representing characterized or measured inter-symbol interference cancellation performance of the receiver. (See fig. 9: 23 "Matrix A, "Matrix O", "Split Matrix O into Matrices T and S" & see fig. 8: 17 & 21 & ¶s 40, 50, 67. ISI cancellation performance in the receiver is dependent on Matrix A". From figure 8 & ¶ 67, it is very clear that the reference of Reznik teaches that matrix A, which is used to compute matrix S, "contains information about any possible cross-channel and inter-symbol interference present in the received data signal". Furthermore, from ¶ 95 the reference of Reznik also teaches that "in alternative embodiment of the present invention the cancellation of inter-symbol interference is delegated to element 39 in figure 9, and from claim 49 "matrix S is used to scale and cancel inter-symbol interference". As you can see, matrix A contains information about any possible inter-symbol interference present in the received signal at the receiver. And this matrix is later used to construct a matrix S, made up of scalar values, in order to scale and cancel inter-symbol interference at the receiver. Therefore, the reference of Reznik does teach/suggest a matrix S which represents characterized or measured inter-symbol interference cancellation performance of the receiver.

However, taking the contrary, applicant does teach in his disclosure that the cancellation metric u may be a dynamically estimated value. And as you can clearly see from Reznik the cancellation metric used to cancel inter-symbol interference is

estimated dynamically.

Applicant further asserts that *"a matrix that incorporates information about the received signal's instantaneous characteristics is effectively the opposite of what the present claims recite: a value that represents characterized or measured ISI cancellation performance of the receiver, i.e., a metric that quantifies how well the cancellation process is expected to perform. Reznik does not in fact disclose or suggest the measuring or characterizing of receiver performance, and does not disclose or suggest a metric that represents a measured or characterized receiver performance".*

The examiner respectfully disagrees. The ISI cancellation performance of the receiver will, in part, depend on how well matrix A is constructed at the receiver. If the construction of matrix A, which is used to construct matrix S, is measured fairly well, inter-symbol interference will most likely be cancelled by the cancellation algorithm at the receiver.

However, taking the contrary, applicant does teach in his disclosure that the cancellation metric u may be a dynamically estimated value. (See ¶ 41) Furthermore, applicant also acknowledges that " *This dynamically calculated matrix is precisely the opposite of a pre-configured value stored in memory*", see page 23 of appeal brief dated 4/15/09. And as you can clearly see from Reznik the cancellation metric used to cancel inter-symbol interference is estimated dynamically.

2. Neither Reznik nor Bottomley discloses "scaling the estimated inter- symbol interference by a cancellation metric" of any sort.

Reznik's matrix S is not used to scale an estimate of inter-symbol interference.

Applicant further asserts that *"The examiner repeatedly cites Reznik's Equation (10) as the basis for concluding that "Reznik suggests scaling the estimated inter-symbol interference by a cancellation metric." See, e.g., Final Office Action at pp. 3-6; Advisory Action at p. 2. However, Reznik's equation (10) shows only that a residual interference vector C(m) is subtracted from a received signal vector Y, and that the resulting difference vector is multiplied by a matrix S. Reznik, I[[0075]. Reznik's matrix S is not used to scale an estimate of inter-symbol interference in the received signal. The vector Y is a filtered version of the received symbol, and the vector C(m) corresponds to the residual interference that remains after ISI has been canceled. Id. at Figure 9,111[[0073]-[0076]. Although Reznik refers to the vector C(m) as "interference estimates", the complete reference is to "us[ing] the direct interference canceller output estimates d to arrive at interference estimates output as a vector C that were not previously canceled by the direct interference canceller." Id. at ¶ [0074], emphasis added. Thus, none of the elements of Equation (10) is the claimed "estimate of inter-symbol interference in the received signal."*

The examiner respectfully disagrees. Please note that applicant first argues that matrix S is not comprised of scalar values. Now, applicant wants to argue that matrix S is not used to scale the estimated inter-symbol interference. In fact, it is very clear from the reference of Reznik that matrix S is used to scale and cancel inter-symbol interference at the receiver. (See fig. 9, ¶s 75 including equation 10, ¶ 95 "where it explicitly teach ISI is cancelled by element 39 in figure 9", ¶ 90 "where it explicitly teach

that element 39 performs the multiplication of Z(m) by matrix S, the canceller 39 performs a scaling of each individual element of the vector Z(m)".) As you can see from the cited paragraphs of Reznik, matrix S is used to scale and cancel inter-symbol interference from the received signal Z(m) by using element 39 in figure 9.

Bottomley does not suggest scaling an estimate of inter-symbol interference.

Applicant further asserts that *"the examiner asserts that Bottomley teaches scaling estimated inter-symbol interference by a cancellation metric, while admitting that Bottomley fails to disclose the cancellation metric of the claims. Final Office Action at p. 5. However, Bottomley does not in fact teach the scaling of estimated inter-symbol interference by any metric at all. Thus, the examiner's proposed incorporation of Reznik's matrix S into "the system of Bottomley" falls apart, and the examiner's rejection fails to establish a prima facie case of obviousness".*

The examiner respectfully disagrees. For the record, the examiner stated in the previous office action that the reference of Bottomley did teach scaling in order to cancel interference. However, what the reference of Bottomley did fail to teach explicitly was that the scaling was based on scalar values. And this why the examiner brought the reference of Reznik, in order to cure Bottomley's deficiency in regards to a metric value comprised of scalar values. Having clarified this issue, the examiner believes the combination of Bottomley and Reznik is proper in that the primary reference (Bottomley) failed to teach that the scaling metric was a scalar value, and that the secondary reference cured this deficiency.

Applicant further asserts that *"however neither operation corresponds to the scaling of an estimate of inter-symbol interference. Equation (41), on the other hand, does not represent actual operations that are performed in a receiver. Rather, Equation (41) represents part of a mathematical explanation as to why a particular interference suppression technique might be effective, given certain circumstances. Id. at p. 1539. Thus, Equation (41) illustrates the theoretical application of weights derived for a particular receiver configuration to a particular interference scenario. As Bottomley puts it, "the suppression of interference can be seen by applying the weights (scaling factor omitted) to the interference components of y(m)." Bottomley at p. 1541. Nothing in Bottomley suggests that a cancellation metric is being used to scale estimated inter-symbol interference. Rather, Equation (41) illustrates a mathematical model in which receiver combining weights are applied to interference components of a received signal. Read in context, it is clear that these interference components are mathematical models for components of interference to a CDMA signal, not estimates of those components. See Bottomley at pp. 1540-41. Bottomley does not teach the estimation of inter-symbol interference, and does not teach that an estimate of inter-symbol interference is scaled with a cancellation metric".*

The examiner respectfully disagrees. The reference of Bottomley does teach explicitly that the received signal is comprised of the symbol of interest, H, and U. U models the overall noise and interference. As you can see from equation, the weights W are derived based on the covariance Ru, and Ru is derived from the expected value

of U. (See section III: B between equations 8 & 9) Furthermore, equations 16-22 are used to further illustrate how inter-symbol interference is model in the received signal, and how Ru is estimated in order to cancel interference.

3. Neither reference discloses or suggests "estimating the received signal quality based on the scaled estimate of inter-symbol interference."

Reznik does not teach or suggest estimating received signal quality at all.

Applicant further asserts that *"Reznik makes no mention at all of estimating receiver signal quality, and does not mention any commonly used measures of signal quality, such as signal-to-noise ratio (SNR), signal-to-interference ratio (SIR), or the like. Indeed, the examiner appears to be aware of this, as the Final Office Action makes no attempt to identify any references to signal quality in Reznik. Instead, the Final Office Action makes a vague reference to Reznik's "soft-decision" and "hard-decision," followed by an assertion that "one skilled in the art would know that these decisions may be used to compute the signal quality." Final Office Action at pp. 6-7. As a statement of fact, this latter assertion is simply incorrect, and is unsupported by the teachings of either reference. In any event, Reznik provides no hint whatsoever that a scaled estimate of inter-symbol interference should be used to estimate received signal quality, and the examiner's finding that Reznik somehow "suggests" this feature is factually and legally without basis".*

The examiner respectfully disagrees. As stated in the last office action, the examiner indicated that it is well known in the art that soft-decision & hard-decision

information may be considered as signal quality. In order to show that this true, the examiner is providing evidence wherein showing that soft-decision information is considered a signal quality. (See US Patent 7,430,257, col. 104, line 1 – col. 105, line 4 & US Publication 2003/0045318 ¶ 64, US Publication 2002/0080863 A1 "figs. 2 & 4) However, taking the contrary, a new ground of rejection has been issued wherein the reference of Bottomley does teach the concept of estimating the SNR ratio based on scaled inter-symbol interference.

Bottomley does not support a conclusion that Reznik's hard decisions or soft decisions may be used to compute signal quality.

Applicant further asserts that *"Rather than teaching that a signal-to-noise ratio (SNR) may be calculated from decision statistics, Bottomley instead teaches how to calculate a signal-to-noise ratio that is referenced to the particular point in the radio receiver where the decision statistics are formed (i.e., at the output of the combiner). Indeed, Bottomley further provides details of the specific calculation, which is not in fact based on the decision statistic z at all. Rather, Bottomley's SNR is based on receiver combining weights w, channel coefficients h, and a noise covariance matrix R. See Bottomley at pp. 1539-1541. The examiner misquotes Bottomley, and the reference to Bottomley in support of the contention that Reznik somehow "suggests" estimating received signal quality based on a scaled estimate of inter-symbol interference is completely without merit".*

The examiner respectfully disagrees. To make it clear what was already explicit

from previous office actions, the examiner cited the reference of Bottomley in order to show that it is well known to estimate the signal quality (e.g. SNR, SIR) of a signal, following the scaling of the received signal (by using the weights) in order to estimate how much interference is still left in the received signal. This was cited in order to illustrate that in the reference of Reznik, a signal quality measurement would have been obvious in order to determine how much interference is still left in the received Signal.

The examiner fails to articulate reasoning with rational underpinning to support the le al conclusion of obviousness of claims 1 17 and 31.

Applicant further asserts that *"Even if the numerous deficiencies in the examiner's factual findings are ignored, the rejection still fails to establish a prima facie case of obviousness because the examiner does not show that a person of ordinary skill in the art would find it obvious to combine the alleged teachings of the references to yield the presently claimed invention. Indeed, these alleged teachings cannot in fact be combined to yield the claimed invention".*

The examiner respectfully disagrees. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed.

Cir. 1992). In this case, the examiner stated in the previous office action that the reference of Bottomley did teach scaling in order to cancel interference. However, what the reference of Bottomley did fail to teach was that the scaling was based on scalar values. And this why the examiner brought the reference of Reznik, in order to cure Bottomley's deficiency in regards to a metric value comprised of scalar values. Therefore, one skilled in the art would have founded obvious to have combined these two references in order to yield appellant's claimed invention.

The rejections of at least dependent claims 3-6, 8, 11-13, 16, 19-21, 23, 26, 27, 33-35, 37, 40, 41, 43, 46 and 47 are unsupported by the references and legally improper.

Applicant further asserts that *"the rejections of at least dependent claims 3-16, 19-30, and 33-47 are each based on either vague and unsupported citations to the references, unsupported allegations that "one skilled in the art would know" of the claimed feature, or both. These rejections fail utterly to establish a prima facie case of obviousness for the corresponding dependent claims, and these rejections are thus improper for at least these additional reasons".*

The examiner respectfully disagrees. MPEP 2144.03 states that: *In certain older cases, official notice has been taken of a fact that is asserted to be "common knowledge" without specific reliance on documentary evidence where the fact noticed was readily verifiable, such as when other references of record supported the noticed fact, or where there was nothing of record to contradict it. See In re Soli,*

317 F.2d 941, 945-46, 137 USPQ 797, 800 (CCPA 1963)

Claims 3, 19, 33, and 43 are not rendered obvious by the cited references.

Applicant further asserts that *"Claim 3 recites, in part, "transmitting corresponding channel quality information to a supporting wireless communication network." Claims 19, 33, and 43 have corresponding limitations. The examiner first alleges that the combination of Bottomley and Reznik discloses the claimed feature, but then asserts: "Furthermore, one skilled in the art would know that WCDMA require mobile terminals to compute received signal quality and transmit TCP commands back to the Base station." Final Office Action at p. 7. In fact, neither Bottomley nor Reznik make any mention of transmitting channel*

The examiner respectfully disagrees. MPEP 2144.03 states that: *In certain older cases, official notice has been taken of a fact that is asserted to be "common knowledge" without specific reliance on documentary evidence where the fact noticed was readily verifiable, such as when other references of record supported the noticed fact, or where there was nothing of record to contradict it. See In re Soli, 317 F.2d 941, 945-46, 137 USPQ 797, 800 (CCPA 1963)*

Claims 4, 20, and 34 are not rendered obvious by the cited references.

Applicant further asserts that *"Claim 4 recites, in part, "generating corresponding link power control commands, and transmitting the link power control commands to a supporting wireless communication network." Claims 20 and 34 have corresponding limitations. The examiner's rejections of these claims are identical to those of claims 3,*

19, and 33, and are similarly unsupported by the cited references".

The examiner respectfully disagrees. MPEP 2144.03 states that: *In certain older cases, official notice has been taken of a fact that is asserted to be "common knowledge" without specific reliance on documentary evidence where the fact noticed was readily verifiable, such as when other references of record supported the noticed fact, or where there was nothing of record to contradict it. See In re Soli, 317 F.2d 941, 945-46, 137 USPQ 797, 800 (CCPA 1963)*

Claims 5, 21, and 35 are not rendered obvious by the cited references.

Applicant further asserts that *"the examiner's allegations as to what "one skilled in the art would know" are beside the point. Of course Reznik's matrix S is computed before it is subsequently used. This fact does not make Reznik's matrix S a pre-configured value, stored in memory of the receiver. Indeed, Reznik teaches that matrix S is calculated during the interference cancellation operation, as a function of matrix A, which is derived from the instantaneous channel response. See Reznik ¶¶ [0029]-[0036]. This dynamically calculated matrix is precisely the opposite of a pre-configured value stored in memory".*

The examiner agrees. However, a new ground of rejection has been issue.

Claim 6 is not rendered obvious by the cited references.

Applicant further asserts that *"claim 6 depends on claim 5 and recites, in part, "determining the pre-configured value of the cancellation metric by characterizing inter-*

symbol interference cancellation performance of the receiver, or of a same type of receiver." The examiner alleges that the claimed feature is disclosed by the cited references. Final Office Action at p. 6. In addition to the fact that this finding contradicts the examiner's finding with regards to claim 5 (i.e., that the pre-configured value is not disclosed, but merely "suggested" by Reznik), neither reference in fact makes any mention of characterizing the inter-symbol interference cancellation performance of a receiver".

The examiner agrees. However, a new ground of rejection has been issue.

Claims 8, 23, and 37 are not rendered obvious by the cited references.

Applicant further asserts that *"Claim 8 recites, in part, "generating a corresponding transmit power control command, and transmitting the power control command to a supporting WCDMA network." Claims 23 and 37 have corresponding limitations. The examiner's rejection is essentially identical to those for claims 3 and 4, and is improper for exactly the same reasons.".*

The examiner agrees. These rejections have been withdrawn.

Claims 11, 26, 40 and 46 are not rendered obvious by the cited references.

Applicant further asserts that *"claim 11 includes an extensive recitation of details for estimating received signal quality, and recites, in part, "estimating a received signal power for the received signal." Claims 26, 40, and 46 include corresponding limitations. The examiner cites Bottomley for these elements. Final Office Action at p. 10. In fact,*

Bottomley is utterly silent with respect to estimating a received signal power for the received signal, and in no event teaches the detailed calculation recited in claims 11,26, 40, and 46".

The examiner agrees. These rejections have been withdrawn.

Claims 12, 27, 41, and 47 are not rendered obvious by the cited references.

Applicant further asserts that *"claim 12 depends on claim 11, and recites, in part, that "the received signal power ... is estimated using combined values corresponding to RAKE fingers in the receiver." Claims 27, 41, and 47 have corresponding limitations. The examiner's rejection is essentially identical to that of claim 11, and is improper for the same reason given above, i.e., that Bottomley makes no mention of estimating received signal power".*

The examiner agrees. These rejections have been withdrawn due to their dependencies to claims 11, 26, 40, & 46, respectivelly.

Claim 13 is not rendered obvious by the cited references.

Applicant further asserts that *"claim 13 is not rendered obvious by the cited references. Claim 13 depends on claim 11, and recites, in part, that "calculating the received signal power based on the magnitudes of net channel responses and signal amplitudes for propagation paths associated with the received signal." The examiner's rejection is identical to those for claims 12 and 13, and is improper for at least the same reason given above.".*

The examiner agrees. This rejection has been withdrawn due to its dependency to claim 11 above.

Claim 16 is not rendered obvious by the cited references.

Applicant finally asserts that *"Claim 16 recites, in part, "generating a combined estimate for inter-symbol interference and other impairment in the received signal and removing a noise variance estimate corresponding to the other impairment from the combined estimate to obtain the cancellation metric." The examiner provides a vague citation to Bottomley in support of the rejection. Final Office Action at page 12. In fact, Bottomley does not disclose or suggest any procedure in which a combined estimate is first formed and then a noise variance estimate removed from the combined estimate to obtain a cancellation metric. The Appellant can discern no factual basis for the examiner's citation to Bottomley whatsoever, and the rejection is improper for at least this additional reason".*

The examiner agrees. These rejections have been withdrawn.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. **Claims (1-4, 7, 9, 17-20, 22, 24, 28, 31-34, 36, 38, 42-44, 45) are rejected under 35 U.S.C. 103(a) as being unpatentable over Bottomley et al (hereinafter Bottomley), *"A Generalized RAKE Receiver for Interference Suppression"*, IEEE Journal on selected areas in communications, Vol. 18, No. 8, August 2000, in view of Reznik. (US Publication 2003/0053526 A1)**

Re claim 1, Bottomley discloses a method of determining received signal quality for a received signal in an inter-symbol interference canceling receiver comprising: generating an estimate of inter-symbol interference in the received signal. (See section III: B, "Combining weights and finger delays", see figure 2 and equations 8, 16, 18, 20 "Y_{ISI}")

The reference of Bottomley discloses the limitations as claimed above, except they fail to explicitly teach estimating the received signal quality based on the scaled estimate of inter-symbol interference.

However, the reference of Bottomley does suggest estimating the received signal quality based on the scaled estimate of inter-symbol interference. (See fig. 2 "the output of the adder", section 3 equation 42 "the suppression of interference can be seen by

applying the weights to the interference components", section 4 equation 43 "SNR ratio at the output of the combiner")

Therefore, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Bottomley, in the manner as claimed, for the benefit of improving the quality of the received signal.

Although the reference of Bottomley does teach scaling the estimated inter-symbol interference by a cancellation metric (See equations 7, 9, 41 “the suppression of interference can be seen by applying the weights to the interference components of Y(mTC)), the reference of Bottomley fails to explicitly teach scaling the estimated inter-symbol interference by a cancellation metric comprising a scalar value representing characterized or measured inter-symbol interference cancellation performance of the receiver.

However, Reznik does. (See fig. 9: 23, 39 “Matrix S” & ¶s 73, 75, 95 “cancellation of inter-symbol interference or ISI”) The reference of Reznik suggests scaling the estimated inter-symbol interference by a cancellation metric (See equation 10 “Matrix S" & claim 49 “Matrix S such that said scaling performs cancellation of inter-symbol interference ISI”) comprising a scalar value representing characterized or measured inter-symbol interference cancellation performance of the receiver. (See fig. 9: 23 “Matrix A, “Matrix O”, “Split Matrix O into Matrices T and S" & see fig. 8: 17 & 21 & ¶s 40, 50, 67. ISI cancellation performance in the receiver is dependent on Matrix A. And Matrix A is computed based on channel estimates calculated at the receiver. Furthermore, one skilled in the art would know that Matrix O is comprised of scalar

values since the multiplication of the hermitian of A and A yields a matrix made up of scalars.)

Therefore, taking the combined teachings of Bottomley and Reznik as a whole, it would have been obvious (obvious to try) to one of ordinary skills in the art to have incorporated this feature into the system of Bottomley, in the manner as claimed and as taught by Reznik, for the benefit of suppressing inter-symbol interference at the receiver using a scalar value.

Re claim 2, the combination of Bottomley and Reznik further discloses that wherein estimating the received signal quality based on the scaled estimate of inter-symbol interference comprises estimating a signal-to-interference ratio of the received signal. (In Bottomley, see section IV)

Re claim 3, the combination of Bottomley and Reznik further discloses that periodically estimating the signal-to-interference ratio of the received signal and periodically transmitting corresponding channel quality information to a supporting wireless communication network. (In Bottomley, see sections I & IV. Furthermore, one skilled in the art would know that WCDMA require mobile terminals to compute received signal quality and transmit TCP commands back to the Base station.)

Re claim 4, the combination of Bottomley and Reznik further discloses that periodically estimating the signal-to-interference ratio of the received signal, generating

corresponding link power control commands, and transmitting the link power control commands to a supporting wireless communication network. (In Bottomley, see sections I & IV. Furthermore, one skilled in the art would know that WCDMA require mobile terminals to compute received signal quality and transmit TCP commands back to the Base station.))

Re claim 7, the combination of Bottomley and Reznik fails to disclose that maintaining the cancellation metric as a dynamically updated value based on inter-symbol interference cancellation performance of the receiver as measured during operation.

However, the reference of Reznik does suggest maintaining the cancellation metric as a dynamically updated value based on inter-symbol interference cancellation performance of the receiver as measured during operation. (See ¶s 75-81 “the cancellation is done iteratively". Furthermore, Matrices S and T are computed based on channel conditions. (See equation 3))

Therefore, it would have been obvious to one of ordinary skills in the art to incorporate these features into the system of Bottomley, as modified by Reznik, for the benefit of cancelling intersymbol interference.

Re claim 9, the combination of Bottomley and Reznik further discloses that, wherein generating an estimate of inter-symbol interference in the received signal comprises generating an expected value of the inter-symbol interference in the received

signal. (In Bottomley, see section III: B, “Combining weights and finger delays”, equation 22.)

Claim 17 is a system claim corresponding to method claim 1. Hence, the steps performed in method claim 1 would have necessitated the elements in system claim 17. Therefore, claim 17 has been analyzed and rejected w/r to claim 1.

Claim 18 is a system claim corresponding to method claim 2. Hence, the steps performed in method claim 2 would have necessitated the elements in system claim 18. Therefore, claim 18 has been analyzed and rejected w/r to claim 2.

Claim 19 is a system claim corresponding to method claim 3. Hence, the steps performed in method claim 3 would have necessitated the elements in system claim 19. Therefore, claim 19 has been analyzed and rejected w/r to claim 3.

Claim 20 is a system claim corresponding to method claim 4. Hence, the steps performed in method claim 4 would have necessitated the elements in system claim 20. Therefore, claim 20 has been analyzed and rejected w/r to claim 4.

Claim 22 is a system claim corresponding to method claim 7. Hence, the steps performed in method claim 7 would have necessitated the elements in system claim 22. Therefore, claim 22 has been analyzed and rejected w/r to claim 7.

Claim 24 is a system claim corresponding to method claim 9. Hence, the steps performed in method claim 9 would have necessitated the elements in system claim 24. Therefore, claim 24 has been analyzed and rejected w/r to claim 9.

Claim 27 is a system claim corresponding to method claim 12. Hence, the steps performed in method claim 12 would have necessitated the elements in system claim 27. Therefore, claim 27 has been analyzed and rejected w/r to claim 12.

Re claim 28, the combination of Bottomley and Reznik further discloses that wherein the processing circuit comprises at least a portion of an integrated circuit device that is arranged and configured for baseband signal processing in a wireless communication receiver. (In Bottomley, see fig. 2)

Claim 31 is a system claim corresponding to method claim 1. Hence, the steps performed in method claim 1 would have necessitated the elements in system claim 31. Therefore, claim 31 has been analyzed and rejected w/r to claim 1. Furthermore, the system described in this reference is a CDMA-based system.

Claim 32 is a system claim corresponding to method claim 2. Hence, the steps performed in method claim 2 would have necessitated the elements in system claim 32. Therefore, claim 32 has been analyzed and rejected w/r to claim 2.

Claim 33 is a system claim corresponding to method claim 3. Hence, the steps performed in method claim 3 would have necessitated the elements in system claim 33. Therefore, claim 33 has been analyzed and rejected w/r to claim 3.

Claim 34 is a system claim corresponding to method claim 4. Hence, the steps performed in method claim 4 would have necessitated the elements in system claim 34. Therefore, claim 34 has been analyzed and rejected w/r to claim 4.

Claim 36 is a system claim corresponding to method claim 7. Hence, the steps performed in method claim 7 would have necessitated the elements in system claim 36. Therefore, claim 36 has been analyzed and rejected w/r to claim 7.

Claim 38 is a system claim corresponding to method claim 9. Hence, the steps performed in method claim 9 would have necessitated the elements in system claim 38. Therefore, claim 38 has been analyzed and rejected w/r to claim 9.

Re claim 42, the combination of Bottomley and Reznik further discloses that, wherein the device comprises a mobile terminal configured for operation in a WCDMA wireless communication network, and wherein the device is configured to determine the received signal quality via use of the processing circuit for one or more received WCDMA signal transmitted by the network. (In Bottomley, see sections I & IV.

Furthermore, one skilled in the art would know that WCDMA require mobile terminals to compute received signal quality and transmit TCP commands back to the Base station.)

Re claim 43, the combination of Bottomley and Reznik further discloses that, wherein the mobile terminal is configured periodically to report Channel Quality Information for a High Speed Packet Data Service signal transmitted by the network based on determining received signal quality for the signal via the processing circuit. (In Bottomley, see sections I & IV. Furthermore, one skilled in the art would know that WCDMA require mobile terminals to compute received signal quality and transmit TCP commands back to the Base station.)

Re claim 44, the combination of Bottomley and Reznik further discloses that, wherein the mobile terminal is configured periodically to transmit forward link power control commands to the network based on determining received signal quality via the processing circuit for one or more WCDMA signals transmitted by the network. (In Bottomley, see sections I & IV. Furthermore, one skilled in the art would know that WCDMA require mobile terminals to compute received signal quality and transmit TCP commands back to the Base station.)

Claim 45 has been analyzed and rejected w/r to claim 1 above. Furthermore, the steps performed in method claim 1 would have necessitated a computer readable medium to store the computer program or instructions.

4. **Claims (5-6, 21, 35) are rejected under 35 U.S.C. 103(a) as being unpatentable over Bottomley et al (hereinafter Bottomley), *"A Generalized RAKE Receiver for Interference Suppression"*, IEEE Journal on selected areas in communications, Vol. 18, No. 8, August 2000, & Reznik (US Publication 2003/0053526 A1), as applied to claims 1, 17, 31 above, and further in view of**

Re claim 5, the combination of Bottomley and Reznik fail to disclose storing the cancellation metric in a memory of the receiver as a pre-configured value.

However, Nielsen does. (See fig. 4 & col. 6, lines 24-50) Nielsen discloses storing the cancellation metric in a memory of the receiver as a pre-configured value.

Therefore, taking the combined teachings of Bottomley, Reznik, & Nielsen as a whole, it would have been obvious to one of ordinary skills in the art to have incorporated this feature into the system of Bottomley, as modified by Reznik, in the manner as claimed and as taught by Nielsen, for the benefit of optimizing the SNR.

Re claim 6, the combination of Bottomley, Reznik, & Nielsen further discloses that determining the pre-configured value of the cancellation metric by characterizing inter-symbol interference cancellation performance of the receiver, or of a same type of receiver. (In Nielsen, see fig. 4 & col. 6, lines 24-50)

Claim 21 is a system claim corresponding to method claim 5. Hence, the steps performed in method claim 5 would have necessitated the elements in system claim 21.

Therefore, claim 21 has been analyzed and rejected w/r to claim 5.

Claim 35 is a system claim corresponding to method claim 5. Hence, the steps performed in method claim 5 would have necessitated the elements in system claim 35. Therefore, claim 35 has been analyzed and rejected w/r to claim 5.

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims (1, 17, 31, 45) are rejected under 35 U.S.C. 102(e) as being anticipated by Nielsen. (US Patent 6,985,518 B2)

Re claim 1, Nielsen discloses a method of determining received signal quality for a received signal in an inter-symbol interference canceling receiver comprising: generating an estimate of inter-symbol interference in the received signal (See figs. 1 & 2 & col. 5, line 14 - col. 6, line 50 “since this system is capable of cancelling interference, it is inherent that it is also capable of estimating the interference"); scaling the estimated inter-symbol interference by a cancellation metric comprising a scalar value corresponding to inter-symbol interference cancellation performance of the receiver (See figs. 1-2, 4: 46 & col.. 5, line 30 - col. 6, line 50 "ro is a scalar value used to optimize the SNR"); and estimating the received signal quality based on the scaled estimate of inter-symbol interference. (See fig. 4: 48)

Claim 17 is a system claim corresponding to method claim 1. Hence, the steps performed in method claim 1 would have necessitated the elements in system claim 17. Therefore, claim 17 has been analyzed and rejected w/r to claim 1.

Claim 31 is a system claim corresponding to method claim 1. Hence, the steps performed in method claim 1 would have necessitated the elements in system claim 31. Therefore, claim 31 has been analyzed and rejected w/r to claim 1. Furthermore, the system described in this reference is a CDMA-based system.

Claim 45 has been analyzed and rejected w/r to claim 1 above. Furthermore, the steps performed in method claim 1 would have necessitated a computer readable medium to store the computer program or instructions.

Allowable Subject Matter

5. Claims (8, 10, 11-16, 21, 23, 25-27, 29-30, 35, 37, 39-41, 46) are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEON FLORES whose telephone number is (571)270-1201. The examiner can normally be reached on Mon-Fri 7-5pm Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. F./
Examiner, Art Unit 2611
July 9, 2009

/Mohammad H Ghayour/
Supervisory Patent Examiner, Art Unit 2611